AMENDMENTS TO THE CLAIMS:

This listing of claims will replace all prior versions and listings of claims in the application:

1. (Currently Amended) A ~~computer-implemented~~ method for development profile simulation comprising:

preparing an actual dissolution rate of a photosensitive resist developed by a developer, the actual dissolution rate being measured outside a computer;

calculating optical intensities in [[a]] the photosensitive resist;

calculating a spatial average value of the optical intensities;

~~reading~~ calculating a ~~measured~~ changing ratio of [[a]] the measured dissolution rate ~~of the photosensitive resist~~ relating to an alkaline concentration ~~changed by~~ of the developer, depending on at least one of exposure dose on the photosensitive resist, a position in [[the]] a thickness direction of the photosensitive resist and [[an]] the alkaline concentration of the developer ~~for the photosensitive resist~~;

obtaining a calculated dissolution rate by using the spatial average value and the ~~measured~~ changing ratio; [[and]]

predicting a pattern shape of the photosensitive resist from the calculated dissolution rate; and

storing the predicted pattern shape in a memory,

wherein the changing ratio is calculated from a logarithm of the measured dissolution rate to the alkaline concentration.

2. (Currently Amended) The method of claim 1, wherein the optical intensities is an are aerial image ~~intensity~~ intensities.

3. (Currently Amended) The method of claim 1, wherein each of the optical intensities ~~is concentration~~ are concentrations of photoreaction products.

4. (Canceled)

5. (Currently Amended) ~~The method of claim 1,~~ A method for development of a profile simulation comprising:

preparing an actual dissolution rate of a photosensitive resist developed by a developer, the actual dissolution rate being measured outside a computer;

calculating optical intensities in the photosensitive resist;

calculating a spatial average value of the optical intensities;

calculating a changing ratio of the measured dissolution rate relating to an alkaline concentration of the developer, depending on at least one of exposure dose on the photosensitive resist, a position in a thickness direction of the photosensitive resist and the alkaline concentration of the developer;

obtaining a calculated dissolution rate by using the spatial value and the changing ratio;

predicting a pattern shape of the photosensitive resist from the calculated dissolution rate; and

storing the predicted pattern shape in a memory,

wherein the ~~measured~~ changing ratio ~~of the dissolution rate~~ is calculated from a logarithm of [[a]] the measured dissolution rate to a logarithm of the alkaline concentration.

6. (Currently Amended) The method of claim 1, wherein the spatial average value is calculated in [[an]] a part of a whole exposed area where the photosensitive resist is exposed in a certain amount or more and dissolves in an initial stage of development.

7. (Currently Amended) The method of claim 1, wherein the spatial average value is calculated in reference positions ~~moving along development time, which is different from~~ of the photosensitive resist when the developer flows on the photosensitive resist, the reference positions being located upstream of the position where the pattern shape of the photosensitive resist is predicted.

8. (Currently Amended) A ~~computer-implemented~~ method for development profile simulation comprising:

preparing an actual dissolution rate of a photosensitive resist developed by a developer, the actual dissolution rate being measured outside a computer;

calculating optical intensities in [[a]] the photosensitive resist;

calculating a spatial average value of the optical intensities;

~~obtaining~~ calculating a changing ratio of a logarithm of [[a]] the measured dissolution rate to an alkaline concentration of the developer ~~for the photosensitive resist~~ or the changing ratio of the logarithm of the measured dissolution rate to a logarithm of the alkaline concentration of the developer ~~for the photosensitive resist~~;

obtaining a calculated dissolution rate by using the spatial average value and the

~~calculated~~ changing ratio of the logarithm of the measured dissolution rate to the alkaline

concentration of [[a]] the developer or the ~~calculated~~ changing ratio of the logarithm of the

measured dissolution rate to the logarithm of [[an]] the alkaline concentration of the developer;

[[and]]

predicting a pattern shape of the photosensitive resist by using the calculated dissolution

rate; and

storing the predicted pattern shape in a memory.

9. (Currently Amended) The method of claim 8, wherein the optical intensities ~~is an~~ are

aerial image ~~intensity~~ intensities.

10. (Currently Amended) The method of claim 8, wherein the optical intensities ~~is~~

~~concentration~~ are concentrations of photoreaction products.

11. (Currently Amended) The method of claim 8, wherein the spatial average value is

calculated in [[an]] a part of a whole exposed area where the photosensitive resist is exposed in a

certain amount or more and dissolves in an initial stage of development.

12. (Currently Amended) The method of claim 8, wherein the spatial average value is

calculated in reference positions of the photosensitive resist when the developer flows on the

photosensitive resist, the reference positions being located upstream of ~~moving along~~

~~development time, which is different from~~ the position where the pattern shape of the

photosensitive resist is predicted.

13. (Currently Amended) A ~~computer-implemented~~ method for development profile

simulation comprising:

<u>preparing an actual dissolution rate of a photosensitive resist developed by a developer,</u>

<u>the actual dissolution rate being measured outside a computer;</u>

calculating optical intensities in [[a]] <u>the</u> photosensitive resist;

calculating a spatial average value of the optical intensities in [[an]] <u>a part of a whole</u>

<u>exposed</u> area where the photosensitive resist <u>is exposed in a certain amount or more and</u>

dissolves in <u>an</u> initial stage of development;

~~reading~~ <u>calculating</u> a ~~measured~~ changing ratio of [[a]] <u>the measured</u> dissolution rate ~~of~~

~~the photosensitive resist~~ relating to an alkaline concentration <u>of the developer;</u>

obtaining a calculated dissolution rate by using the spatial average value and the

~~measured~~ changing ratio; [[and]]

predicting a pattern shape of the photosensitive resist by using the calculated dissolution

rate<u>; and</u>

<u>storing the predicted pattern shape in a memory.</u>

14. (Currently Amended) The method of claim 13, wherein the optical intensities ~~is an~~

<u>are</u> aerial image ~~intensity~~ <u>intensities.</u>

15. (Currently Amended) The method of claim 13, wherein the optical intensities ~~is concentration~~ are concentrations of photoreaction products.

16. (Currently Amended) The method of claim 13, wherein the ~~measured~~ changing ratio ~~of the dissolution rate~~ is calculated from [[a]] the logarithm of a measured dissolution rate to the alkaline concentration.

17. (Currently Amended) The method of claim 13, wherein the ~~measured~~ changing ratio ~~of the dissolution rate~~ is calculated from a logarithm of [[a]] the measured dissolution rate to a logarithm of the alkaline concentration.

18. (Currently Amended) The method of claim 13, wherein the spatial average value is calculated in reference positions <u>of the photosensitive resist when the developer flows on the photosensitive resist, the reference positions being located upstream of</u> ~~moving along development time, which is different from~~ the position where the pattern shape of the photosensitive resist is predicted.

19. (Currently Amended) A ~~computer-implemented~~ method for development profile simulation comprising:

<u>preparing an actual dissolution rate of a photosensitive resist developed by a developer, the actual dissolution rate being measured outside a computer;</u>

calculating optical intensities in a target position to predict a pattern shape of [[a]] the photosensitive resist and <u>in</u> reference positions <u>of the photosensitive resist, the reference</u>

positions being located upstream of the target position when the developer flows on the

photosensitive resist ~~moving along development time~~;

calculating spatial average values of the optical intensities in the reference positions;

~~reading~~ calculating a ~~measured~~ changing ratio of [[a]] the measured dissolution rate ~~of~~

~~the photosensitive resist~~ relating to [[the]] an alkaline concentration of the developer;

obtaining calculated dissolution rates by using the spatial average values in the reference

positions and the ~~measured~~ changing ratio; [[and]]

predicting the pattern shape of the photosensitive resist in the target position by using the

calculated dissolution rates and the optical intensities in the target position; and

storing the predicted pattern shape in a memory.

20. (Currently Amended) The method of claim 19, wherein the optical intensities ~~is an~~

are aerial image ~~intensity~~ intensities.

21. (Currently Amended) The method of claim 19, wherein the optical intensities [[is]]

are ~~concentration~~ concentrations of photoreaction products.

22. (Currently Amended) The method of claim 19, wherein the ~~measured~~ changing ratio

~~of the dissolution rate~~ is calculated from a logarithm of [[a]] the measured dissolution rate to the

alkaline concentration.

23. (Currently Amended) The method of claim 19, wherein the ~~measured~~ changing ratio ~~of the dissolution rate~~ is calculated from a logarithm of [[a]] the measured dissolution rate to a logarithm of the alkaline concentration.

24. (Currently Amended) The method of claim 19, wherein the spatial average value is calculated in [[an]] a part of a whole exposed area where the photosensitive resist is exposed in a certain amount or more and dissolves in an initial stage of development.

25. (Currently Amended) A computer program product for controlling a computer system so as to simulate a development profile, the computer program product comprising:

a recording medium readable by the computer system;

instructions recorded on the recording medium for directing the computer system to prepare an actual dissolution rate of a photosensitive resist developed by a developer, the actual dissolution rate being measured outside the computer system;

instructions ~~configured~~ recorded on the recording medium for directing the computer system to calculate optical intensities in [[a]] the photosensitive resist ~~within the computer system~~;

instructions ~~configured~~ recorded on the recording medium for directing the computer system to calculate a spatial average value of the optical intensities ~~within the computer system~~;

instructions ~~configured~~ recorded on the recording medium for directing the computer system to ~~read~~ calculate a ~~measured~~ changing ratio of [[a]] the measured dissolution rate ~~of the photosensitive resist~~ relating to an alkaline concentration ~~changed by~~ of the developer, depending on at least one of exposure dose on the photosensitive resist, a position in [[the]] a

thickness direction of the photosensitive resist and [[an]] the alkaline concentration of the

developer ~~for the photosensitive resist within the computer system~~;

instructions ~~configured~~ recorded on the recording medium for directing the computer

system to obtain a calculated dissolution rate by using the spatial average value and the ~~measured~~

changing ratio ~~within the computer system~~; [[and]]

instructions ~~configured~~ recorded on the recording medium for directing the computer

system to predict a pattern shape of the photosensitive resist from the calculated dissolution rate

~~within the computer system~~; and

instructions recorded on the recording medium for directing the computer system to store

the predicted pattern shape in a memory,

wherein the changing ratio is calculated from a logarithm of the measured dissolution rate

to the alkaline concentration.

26. (Currently Amended) A computer program product for controlling a computer

system so as to simulate a development profile, the computer program product comprising:

a recording medium readable by the computer system;

instructions recorded on the recording medium for directing the computer system to

prepare an actual dissolution rate of a photosensitive resist developed by a developer, the actual

dissolution rate being measured outside the computer system;

instructions ~~configured~~ recorded on the recording medium for directing the computer

system to calculate optical intensities in [[a]] the photosensitive resist ~~within the computer system~~;

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~~instruction configured~~ <u>instructions recorded on the recording medium for directing the</u> <u>computer system</u> to calculate a spatial average value of the optical intensities ~~within the~~ ~~computer system~~;

~~instruction configured~~ <u>instructions recorded on the recording medium for directing the</u> <u>computer system</u> to ~~obtain~~ <u>calculate</u> a changing ratio of a logarithm of a measured dissolution rate to an alkaline concentration of <u>the</u> developer ~~for the photosensitive resist~~ or the changing ratio of the logarithm of the measured dissolution rate to a logarithm of the alkaline concentration of the developer ~~for the photosensitive resist within the computer system~~;

~~instruction configured~~ <u>instructions recorded on the recording medium for directing the</u> <u>computer system</u> to obtain a calculated dissolution rate by using the spatial average value and the ~~calculated~~ changing ratio of the logarithm of the measured dissolution rate to <u>the</u> alkaline concentration of the developer or the ~~calculated~~ changing ratio of the logarithm of the measured dissolution rate to the logarithm of the alkaline concentration of the developer ~~within the~~ ~~computer system~~; ~~and~~

~~instruction configured~~ <u>instructions recorded on the recording medium for directing the</u> <u>computer system</u> to predict a pattern shape of the photosensitive resist by using the calculated dissolution rate ~~within the computer system~~<u>; and</u>

<u>instructions recorded on the recording medium for directing the computer system to store</u> <u>the predicted pattern shape in a memory.</u>

27. (Currently Amended) A computer program product for controlling a computer system so as to simulate <u>a</u> development profile, the computer program product comprising:

<u>a recording medium readable by the computer system;</u>

instructions recorded on the recording medium for directing the computer system to prepare an actual dissolution rate of a photosensitive resist developed by a developer, the actual dissolution rate being measured outside the computer system;

~~instruction configured~~ instructions recorded on the recording medium for directing the computer system to calculate optical intensities in [[a]] the photosensitive resist ~~within the computer system~~;

~~instruction configured~~ instructions recorded on the recording medium for directing the computer system to calculate a spatial average value of optical intensities in [[an]] a part of a whole exposed area where the photosensitive resist is exposed in a certain amount or more and dissolves in an initial stage of development ~~within the computer system~~;

~~instruction configured~~ instructions recorded on the recording medium for directing the computer system to [[read]] calculate a ~~measured~~ changing ratio of [[a]] the measured dissolution rate ~~of the photosensitive resist~~ relating to an alkaline concentration of the developer ~~within the computer system~~;

~~instruction configured~~ instructions recorded on the recording medium for directing the computer system to obtain a calculated dissolution rate by using the spatial average value and the ~~measured~~ changing ratio ~~within the computer system~~; [[and]]

~~instruction configured~~ instructions recorded on the recording medium for directing the computer system to predict a pattern shape of the photosensitive resist by using the calculated dissolution rate ~~within the computer system~~; and

instructions recorded on the recording medium for directing the computer system to store the predicted pattern shape in a memory.

28. (Currently Amended) A computer program product for controlling a computer

system so as to simulate a development profile, the computer program product comprising:

a recording medium readable by the computer system;

instructions recorded on the recording medium for directing the computer system to

prepare an actual dissolution rate of a photosensitive resist developed by a developer, the actual

dissolution rate being measured outside the computer system;

~~instruction configured~~ instructions recorded on the recording medium for directing the

computer system to calculate optical intensities in a target position to predict a pattern shape of

[[a]] the photosensitive resist and in reference positions of the photosensitive resist, the reference

positions being located upstream of the target position when the developer flows on the

photosensitive resist ~~moving along development time within the computer system~~;

~~instruction configured~~ instructions recorded on the recording medium for directing the

computer system to calculate spatial average values of the optical intensities in the reference

positions ~~within the computer system~~;

~~instruction configured~~ instructions recorded on the recording medium for directing the

computer system to ~~read~~ calculate a ~~measured~~ changing ratio of [[a]] the measured dissolution

rate ~~of the photosensitive resist~~ relating to ~~the~~ an alkaline concentration ~~within the computer~~

~~system~~ of the developer;

~~instruction configured~~ instructions recorded on the recording medium for directing the

computer system to obtain calculated dissolution rates by using the spatial average values in the

reference positions and the ~~measured~~ changing ratio ~~within the computer system~~; [[and]]

~~instruction configured~~ instructions recorded on the recording medium for directing the

computer system to predict the pattern shape of the photosensitive resist in the target position by

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using the calculated dissolution rates and the optical intensities in the target position ~~within the computer system~~; and

instructions recorded on the recording medium for directing the computer system to store the predicted pattern shape in a memory.

29. (Currently Amended) A ~~computer-implemented~~ method for mask pattern data correction comprising:

preparing an actual dissolution rate of a photosensitive resist developed by a developer, the actual dissolution rate being measured outside a computer;

reading a designed pattern data in [[a]] the photosensitive resist[[,]] and a mask pattern data[[,]]; [[and]]

calculating a ~~measured~~ changing ratio of [[a]] the measured dissolution rate ~~of the photosensitive resist~~ relating to an alkaline concentration of the developer, depending on ~~changed by~~ at least one of exposure dose on the photosensitive resist, a position in the thickness direction of the photosensitive resist and an alkaline concentration of the developer ~~for the photosensitive resist~~;

calculating optical intensities in the photosensitive resist by using the mask pattern data;

calculating a spatial average value of the optical intensities;

obtaining a calculated dissolution rate by using the spatial average value and the ~~measured~~ changing ratio;

predicting a pattern shape of the photosensitive resist from the calculated dissolution rate; [[and]]

optimizing the mask pattern data so as to make the calculated pattern shape similar to the

designed pattern data in the photosensitive resist; and

storing the optimized mask pattern data in a memory,

wherein the changing ratio is calculated from a logarithm of the measured dissolution rate

to the alkaline concentration.

30. (Currently Amended) A computer-implemented method for mask pattern data

correction comprising:

preparing an actual dissolution rate of a photosensitive resist developed by a developer,

the actual dissolution rate being measured outside a computer;

obtaining a designed pattern data in [[a]] the photosensitive resist[[,]] and a mask pattern

data[[,]]; and a calculated

calculating a changing ratio of a logarithm of [[a]] the measured dissolution rate to an

alkaline concentration of the developer for the photosensitive resist or the calculated changing

ratio of the logarithm of the measured dissolution rate to a logarithm of the alkaline

concentration of the developer for the photosensitive resist;

calculating optical intensities in the photosensitive resist by using the mask pattern data;

calculating a spatial average value of the optical intensities;

obtaining a calculated dissolution rate by using the spatial average value and the

measured changing ratio;

predicting a pattern shape of the photosensitive resist from the calculated dissolution rate;

[[and]]

optimizing the mask pattern data so as to make the calculated pattern shape similar to the

designed pattern data in the photosensitive resist; and

storing the optimized mask pattern data in a memory.

31. (Currently Amended) A computer-implemented method for mask pattern data

correction comprising:

preparing an actual dissolution rate of a photosensitive resist developed by a developer,

the actual dissolution rate being measured outside a computer;

reading a designed pattern data in [[a]] the photosensitive resist[[,]] and a mask pattern

data; ,-and

calculating a measured changing ratio of [[a]] the measured dissolution rate of the

photosensitive resist relating to an alkaline concentration of the developer;

calculating optical intensities in the photosensitive resist by using the mask pattern data;

calculating a spatial average value of optical intensities in [[an]] a part of a whole

exposed area where the photosensitive resist is exposed in a certain amount or more and

dissolves in an initial stage of development;

obtaining a calculated dissolution rate by using the spatial average value and the

measured changing ratio;

predicting a pattern shape of the photosensitive resist from the calculated dissolution rate;

[[and]]

optimizing the mask pattern data so as to make the calculated pattern shape similar to the

designed pattern data in the photosensitive resist; and

storing the optimized mask pattern data in a memory.

32. (Currently Amended) A ~~computer-implemented~~ method for mask pattern data correction comprising:

<u>preparing an actual dissolution rate of a photosensitive resist developed by a developer, the actual dissolution rate being measured outside a computer;</u>

reading a designed pattern data in [[a]] <u>the</u> photosensitive resist[[,]] <u>and</u> a mask pattern data<u>;</u> [[, and]]

<u>calculating</u> a ~~measured~~ changing ratio of [[a]] <u>the measured</u> dissolution rate ~~of the photosensitive resist~~ relating to ~~the spatial average value~~ <u>an alkaline concentration of the developer</u>;

calculating optical intensities in a target position of the photosensitive resist and <u>in</u> reference positions <u>of the photosensitive resist</u> ~~moving along development time~~ by using the mask pattern data<u>, the reference positions being located upstream of the target position when the developer flows on the photosensitive resist moving along development time</u>;

calculating a spatial average value of the optical intensities in the reference positions;

obtaining a calculated dissolution rate by using the spatial average value in the reference positions and the ~~measured~~ changing ratio;

predicting a pattern shape of the photosensitive resist by using the calculated dissolution rate and the optical intensities in the target position; [[and]]

optimizing the mask pattern data so as to make the calculated pattern shape similar to the designed pattern data in the photosensitive resist<u>; and</u>

<u>storing the optimized mask pattern data in a memory</u>.